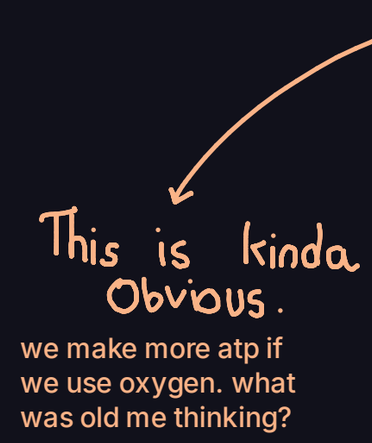
here's sum mind boggling doubts:

Why we don't use other molecules for making energy (It's the bond that makes energy, so why don't we use cholestrol or urea?)
https://pastebin.com/nERRs6Kk

Why we don't make energy like prokaryotes:
https://pastebin.com/jwF76uqt



Why we spent ATP, when we could have used an inorganic phosphate (imp is from line 148)
https://pastebin.com/a66pCZCq

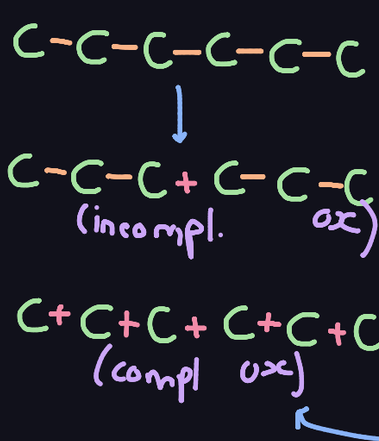
Where we get energy from in Kreb's cycle
(SPOILER ALERT: IT'S GLUCOSE BONDS)
https://pastebin.com/5P2Zya1X

Why the enzyme converting Citrase to Isocitrase is called anicitrase but not isomerase cause it converts a molecule to its isomer (Similar to G6P>F6P in glycolysis)

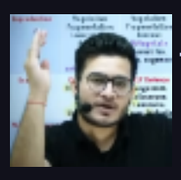
Its just that it has 2 steps in bw that we dont see or need to know
https://pastebin.com/9wbywv3y

Some more random info
https://pastebin.com/arUkQvSa
https://pastebin.com/93e7C521

Respiration in Plants



energy is stored in bonds, break bonds = energy

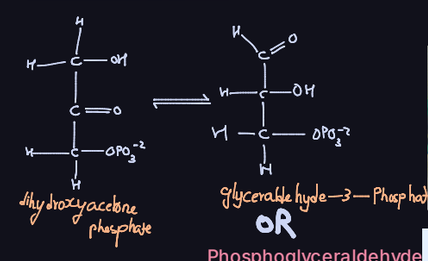


jab phosphate ka len den ho to naam hoga kinase

jab NAD/FAD aur NADH/ FADH ka len den ho to dehydrogenase hoga

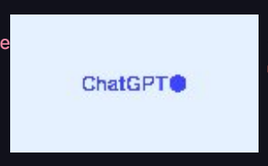
Glycolysis

Note: Please don't think too deep about why there are two diff molecules. If you do, you'll have to understand fructose and glucose structure which will waste your time so justt remember this the way it is in NCERT.

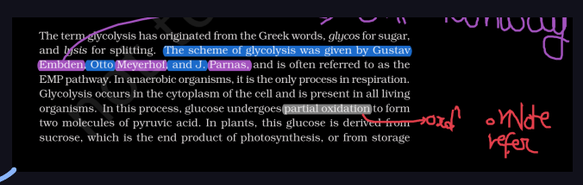


so i guess thats it lets just add one phosphate

guess thats called biphosphate



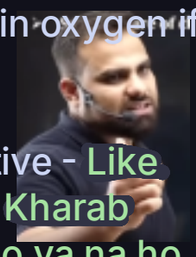
hey, wait thats wrong.
the correct name is fructose-1,6-bisphosphate, not biphosphate.


The term glycolysis has originated from the Greek words, *glycos* for sugar, and *lysis* for splitting. The scheme of glycolysis was given by Gustav Embden, Otto Meyerhof, and J. Parnas, and is often referred to as the EMP pathway. In anaerobic organisms, it is the only process in respiration. Glycolysis occurs in the cytoplasm of the cell and is present in all living organisms. In this process, glucose undergoes partial oxidation to form two molecules of pyruvic acid. In plants, this glucose is derived from sucrose, which is the end product of photosynthesis, or from storage

when u wanna buy smth, u dont go all out and spend ur whole wallet. only take a few bills and leave. similarly, energy isnt released at once. small bits so u can trap good. otherwise everything released in heat.

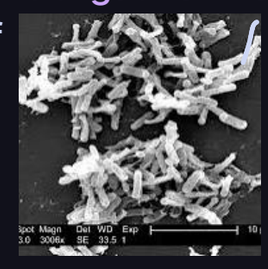
Types of Anaerobes:

- doesn't need oxygen but can survive in oxygen if needed



Facultative - Like faculty: Kharab bacha ho ya na ho hum padhayenge

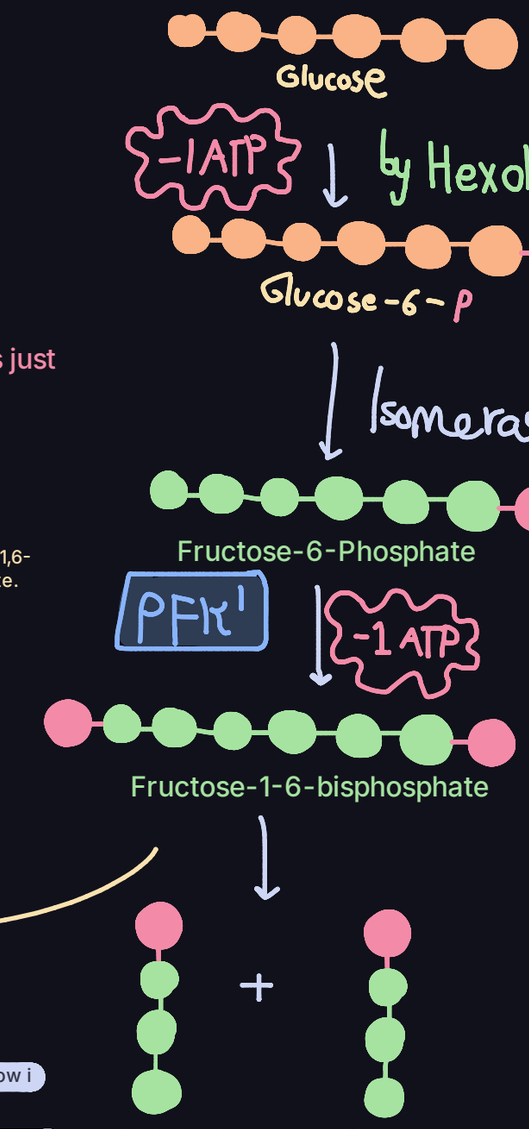
Obligative Anaerobe

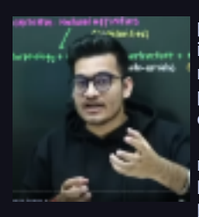


Can tolerate oxygen. too much? will die.

If its obliged to oxygen in a CLOSET, then it die.

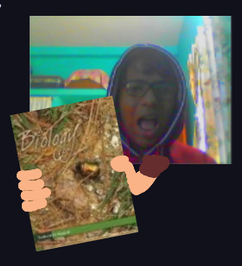
Closet - clostridium





phosphate added to lock glucose in place cuz glucose is a neutral molecule that can escape, when phosphate is attached, it cant go cuz its now an ion

mama ki dukaan nahi hai phospate le aoge, atp se lana padega. atp banane ke lie atp khona padta hn.

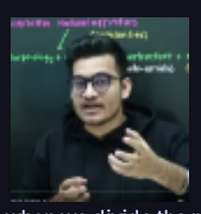


converting glucose into fructose now, huh?

ncert specifically says **"glucose isomerises to fructose"**

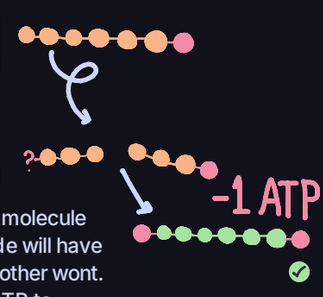
what that mean?

ah, now why is fructose needed?



when we divide the molecule into 2 parts, one side will have phosphate and the other wont. we will spend one ATP to attach a phosphate. but wait.

glucose structure doesnt allow phosphate to attach. but fructose does. so we convert it to fructose.

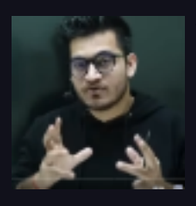


and additional info, since glucose and fructose are both isomers, the enzyme used is obviously **isomerase!**

Google

isomerisation = same formula, diff sturcture and properties.

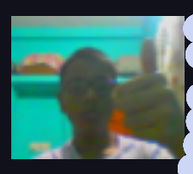
itna sab todne ke lie hi kar rahe the, so next step obv todna hi hai



that right there was the slowest step (f-6-p >> f-6-bip) of this whole process.
it determines the rate.

aap shaadi ke liye jaa rahe ho. papa mummy aap sab taiyar. appki behen nahi taiyyar. bolti 5min joki hai 1ghanta minimum.

to behan karenge rate determine.
sab niklenge jab wo taiyyar.
you have to bear the slowest step.



thats cool nd all, but heres how i see the step:

its like citrate synthase from krebs cycle: a knob which can turn up or down when atp is needed or not. when atp has run out, it can speed it up slow this step down when theres loads of atp

here the carb on the left was obv having a hydrogen cuz nothing was attached. (not rlly nothing cuz theres oh and allat but)

so when phosphate added, hydrogen is pulled out and thrown to NAD to make NADH.

ATP is more powerful, it needs to lock the glucose in for glycolysis. Now that it's already locked in, we can just throw a regular PO^{3-} at it.

Here we convert the Ketone to Aldehyde

Phosphoglyceraldehyde 2X

Inorganic phosphate

NAD → NADH

1,3-bisphosphoglycerate 2X

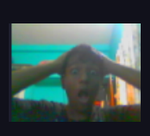
ADP → ATP

3-phosphoglycerate

(Refer to pastebin for why ATP isn't used/ why Phosphate not used in start)

Simple answer: ATP is a big boom grenade, Phosphate is just a matchstick.

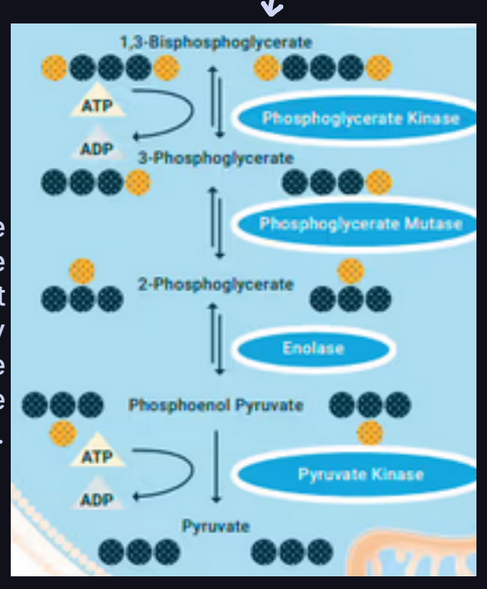
Now we immediately take the PO that we attached and add it to ADP to make ATP.

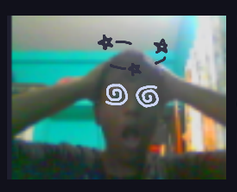


vipin sir said partial oxn is breakng of some bonds

or removing hydrogen

after this, everyone ignores the structure seems like this part isnt imp, only remember the names if U rlly have to. and the enzymes.

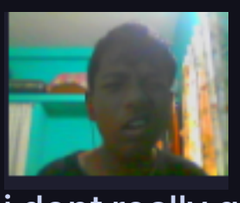




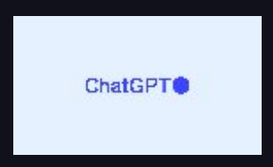
I AGAIN REQUEST YOU TO NOT ASK AI YOUR OUT OF SYALLBAUS DOUBTS U WILL GET CONFUSED FOR NO REASON PLZ FOLLOW NCERT

I ASKED WHY EACH STEP IS NEEDED AND WAAAAAAAAAAAA 😭

I CANT REMEMBER THE ENDING OF GLYCOLYSIS JUST YET, SO we will COME TO THIS LATER



i dont really get it. at the end, the ATP is made by the phosphate ions we spent or got from the cytoplasm. whats the point of glucose?



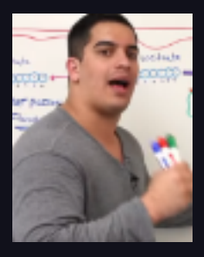
Glucose isn't the donor of phosphate, the bonds in it are broken to make energy to push the reaction forward or push the phosphate to ADP.

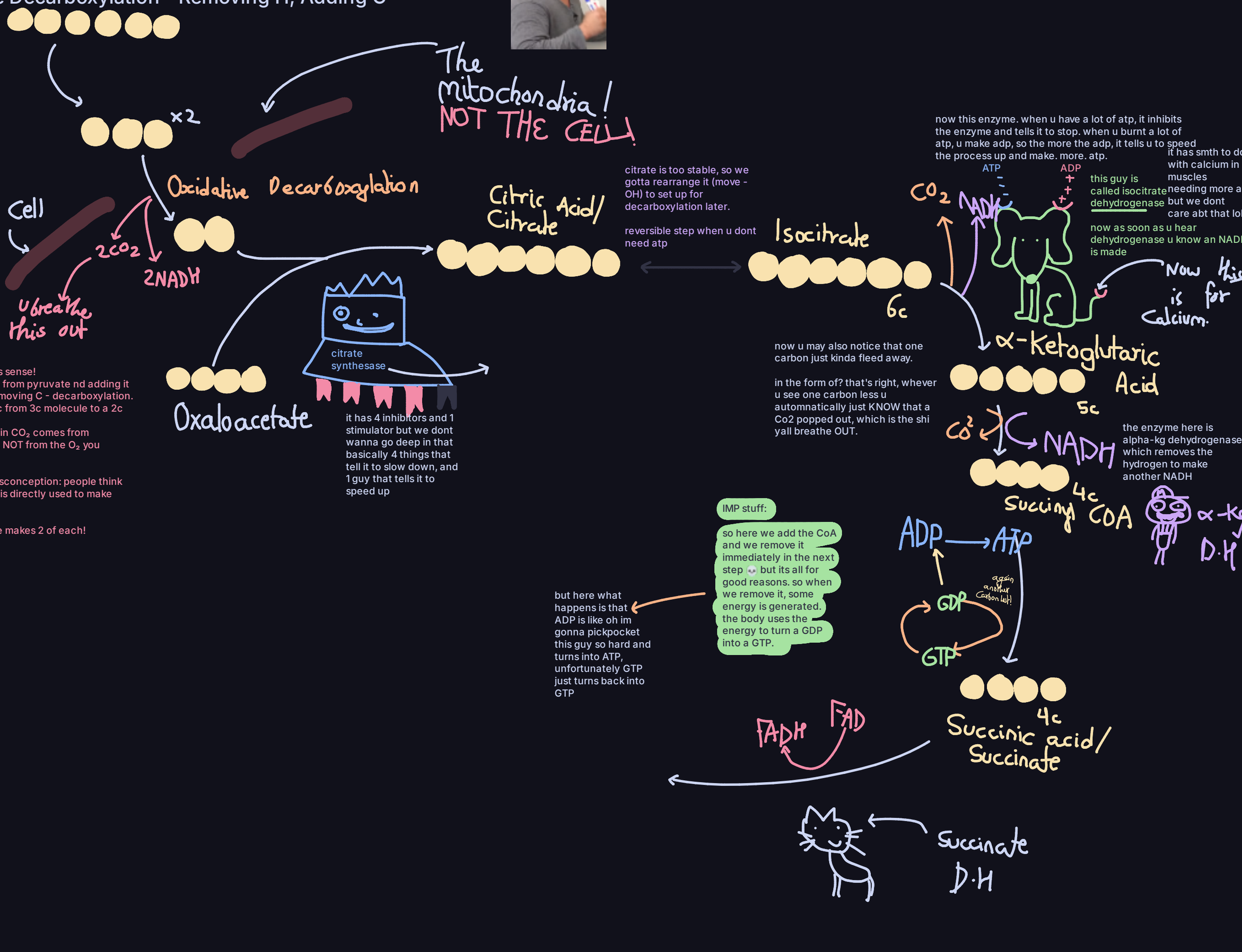
Fate of Pyruvate

Kreb's Cycle (NINJA NERD LEVEL💀)

Do this and NCERT's kreb cycle will feel baby mode 🤯

Oxidative Decarboxylation - Removing H, Adding C




The mitochondria! NOT THE CELL!
x2
Cell
Oxidative Decarboxylation
2CO2
2NADH
Ubreathe this out
Citric Acid/ Citrate
citrate synthesase
Oxaloacetate
citrate is too stable, so we gotta rearrange it (move -OH) to set up for decarboxylation later.
reversible step when u dont need atp
Isocitrate
6c
now this enzyme. when u have a lot of atp, it inhibits the enzyme and tells it to stop. when u burnt a lot of atp, u make adp, so the more the adp, it tells u to speed the process up and make. more. atp.
ATP
ADP
this guy is called isocitrate dehydrogenase
it has smth to do with calcium in muscles needing more at but we dont care abt that lol
now as soon as u hear dehydrogenase u know an NADH is made
Now this is for Calcium.
CO2
NADH
α-Ketoglutaric Acid
5c
CO2
NADH
4c
Succinyl COA
α-kg D·H
the enzyme here is alpha-kg dehydrogenase which removes the hydrogen to make another NADH
IMP stuff:
so here we add the CoA and we remove it immediately in the next step 💀 but its all for good reasons. so when we remove it, some energy is generated. the body uses the energy to turn a GDP into a GTP.
but here what happens is that ADP is like oh im gonna pickpocket this guy so hard and turns into ATP, unfortunately GTP just turns back into GTP
ADP
ATP
again another Carbon left
GDP
GTP
4c
Succinic acid/ Succinate
FADH
FAD
Succinate D·H

this? just makes sense!
removing the h from pyruvate nd adding it to NAD. And removing C - decarboxylation.
removing one c from 3c molecule to a 2c molecule.
👉 The oxygen in CO_2 comes from pyruvate itself, NOT from the O_2 you breathe.

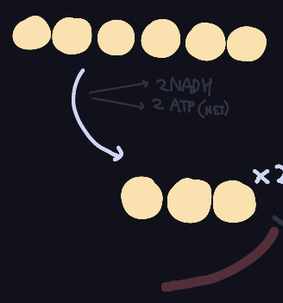
💀 Common misconception: people think the O_2 from air is directly used to make CO_2.

And 2 pyruvate makes 2 of each!

it has 4 inhibitors and 1 stimulator but we dont wanna go deep in that basically 4 things that tell it to slow down, and 1 guy that tells it to speed up

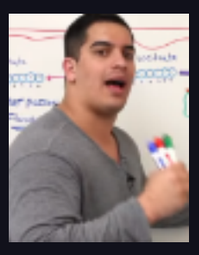
Electron Transport System (NINJA NERD LEVEL 💀)

Do this and NCERT's ETS will feel baby mode 🤯

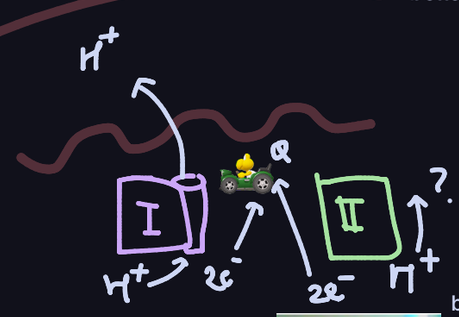


1 NADH = 3 ATP

1 $FADH_2$ = 2 ATP

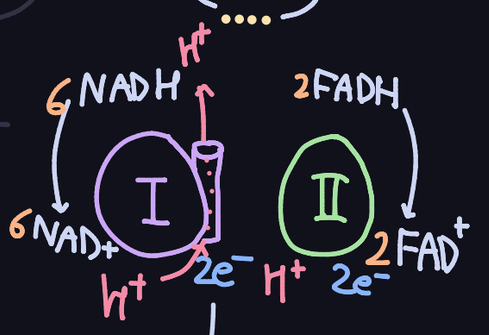


gonna explain it better here



basically, XADH turns into XAD, spits out two electrons and H+. High energy in both enzymes, want to stay in low energy, pass onto blue guy. When passing, energy transfer unlocks pore in complex I, H+ gets thrown out.

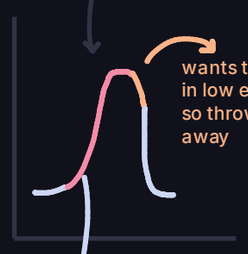
NADH bahut bana hai to obvious hai ki pehle NADH ka kaam hoga.



I = NADH dehydrogenase

II = Succinate dehydrogenase - complex

so these two enzymes act diff. heres the graph of I when he gains e-

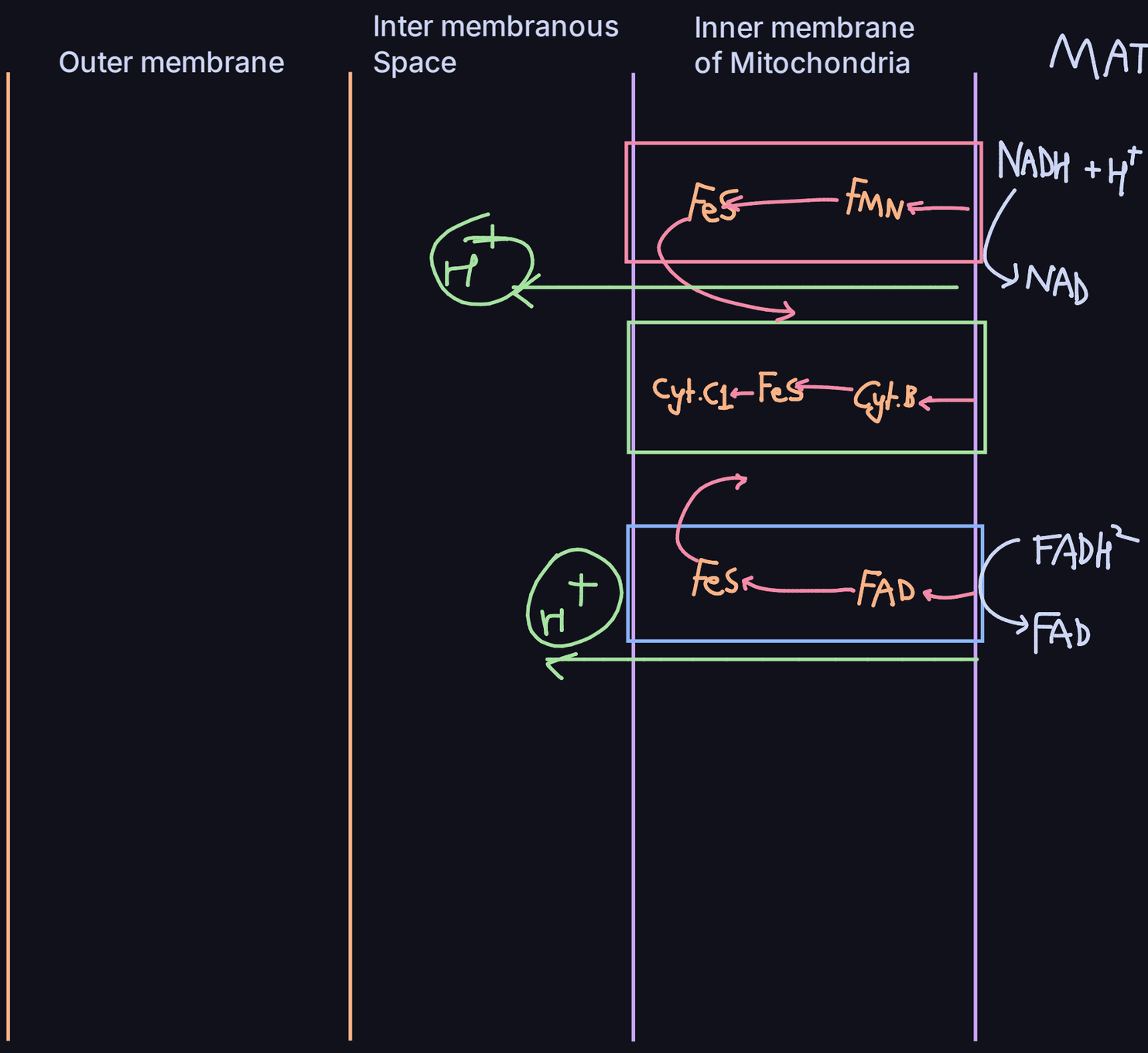


gains e- which high in energy

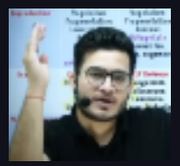
when he transfers the e, the energy transfer creates a chane in the molecule which makes the pore open (mela maal)

this guy here is co enzyme Q

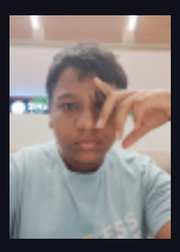
he isnt protein based, and can move around.



Flavin mono nucleotide carries the hydrogen (and its electrons) Then Coenzyme Q is a mobile molecule that isn't protein and is like hey I'll take care of that and just takes it. Complex II does the samething but for FADH. Now Complex II is called Succinate Dehydrogenase cause FADH was made in the Succinate step. Its actually the same enzyme that was in the Kreb's Cycle/Citric Acid Cycle. (NINJA NERD's PART, IGNORE)



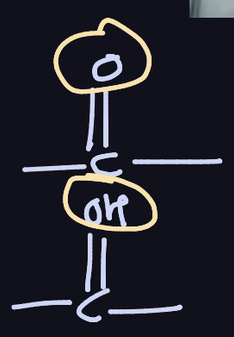
the arrows show the elctrons being transported. jyada leectrons hote hai. kucho ko proton chahiye hota hai, excess proton (H+) bahar bhej dia jata hai.



i would ask random ahh doubts like where cytb is getting the elctrons from but i just wanna get this aiats over with (the arrow points from nowehere)

u find Ubiquinone there. It is ketone. need to turn into alcohol.

Ubiquinol



so it needs electrons as well as a hydrogen+ which is just protons lol (hydrogen without electrons is just the nucleus which has no neutron haha)

It has 5 complexes:

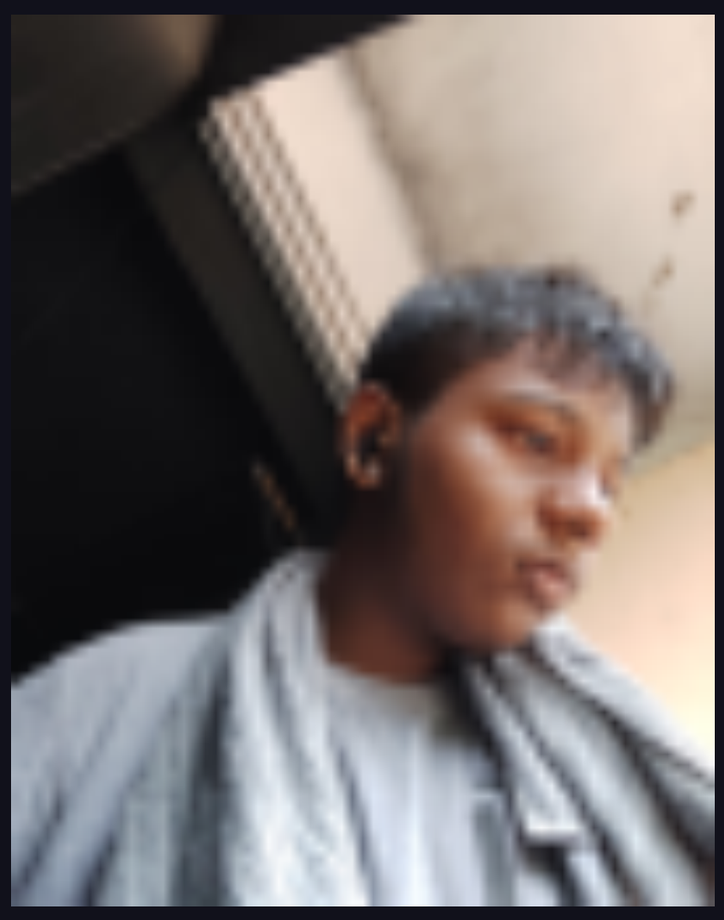
Complex 1: NADH-Dehydrogenase complex: Flavin Mono nucleotide (FMN); FeS (Iron Sulphur)

→ Mono

Complex 2: FADH /Succinate-deyhydrogenase complex: Flavin Adenine Di nucleotide (FAD); FeS

→ Di

Complex 3: Cyt . bc, complex: cyt. b ⟶ FeS ⟶ CytC



im gonna wrap it up there im not studing this anymore i just want aiats to overrrrrrr waaaaaaaaaaaaa